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Commentary

Brief Note on Radar System

Joseph Stephen*

Department of Geography and Planning, University of Toronto, Toronto, Canada

DESCRIPTION

Radar is derived from radio detection and ranging, with the development of clear context. It involves the transmission of signals at radio frequencies. These signals scatter from objects in the radar beam and information about these objects is gained by measuring the scattered radiation. For military purposes and also for many civilian tasks, such as air traffic control or ship monitoring, the objects are usually human made which is intresting and relatively small and the problem is to detect them against a background of scatter from their surroundings which is commonly called "clutter" and random system noise. Systematic experiments, beginning in the 1960s with ground based systems, exhibit the diplomacy of radar to fact such as sea state, soil moisture, agricultural vegetation development etc. This motivated the development of remote sensing radars designed to look down at the earth. The early systems were carried on aircraft, but the event that really exhibit the value of this technology was the seasat satellite mission, in 1978. As its name implies, the purpose of seasat was to have information regarding the oceans. Radar data have provided information on fact as diverse as earthquakes, ocean currents, forest biomass and the dynamics of glaciers. Many of these applications usage of these things that are distinctive to radar systems and that certify the place of radar in the scope of sensors need to understand properly the earth as a system.

Basic properties of radar systems are as the name suggests, radar remote sensing systems work in the radio microwave range of frequencies, from about 0.03 to 30 MHz this five to six orders of magnitude less than those of the optical bands and corresponds to wavelengths from about 1 cm to about 10 meters. Many reactions flow from this, both for the measurements possible by these systems and their response to the environment. Except at the shortest wavelengths, it is also unaffected by rain. Hence radar can obtain images of Earth under all weather status. In a wider context, the outstanding images of Venus provided by the pioneer, venera and particularly the magellan radar satellites strikingly illustrate this cloud penetrating property. The planet Venus is completely cloud covered and everything we know about its surface comes from these radar images.

As wavelength increases, the ability of the radar to probe vegetation canopies and into the soil also increases, giving the possibility of measuring soil properties through overlying vegetation and observing sub surface structures. Characteristics of Radar Systems based on what radar actually measures, it is important to have an idea of the system properties affecting the radar signal. Designers of remote sensing radars must make a variety of choices, depending on the intended application of the sensor. The most important decisions concern the frequency, polarisation and incidence angle characteristics of the system, although Encyclopedia of Life Support Systems (EOLSS) important issues for usage are spatial resolution and time between successive data possession which is the revisit time of the sensor. Two important illustrations of an electromagnetic wave are its amplitude and phase.

Frequency is determined not just by the desired properties of the sensor, but also by the need to gratify the needs of other users of the radio bands. The frequencies most commonly used by remote sensing radars are given, along with the corresponding wavelengths and examples of systems using them. Polarization in remote sensing radars transmit linearly polarized signals. These are described as vertically polarized if the electric field of the wave lies in the plane defined by the propagation direction and the direction of a line pointing outwards from the earth's center in radius vector and horizontally polarized if the electric field is perpendicular to this plane.

Correspondence to: Joseph Stephen, Department of Geography and Planning, University of Toronto, Toronto, Canada,
E-mail: jstephen@tor.cn

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